

Feasibility Study to Simultaneously Objectively Assess Activity and Location of Hispanic-American Preschool Children



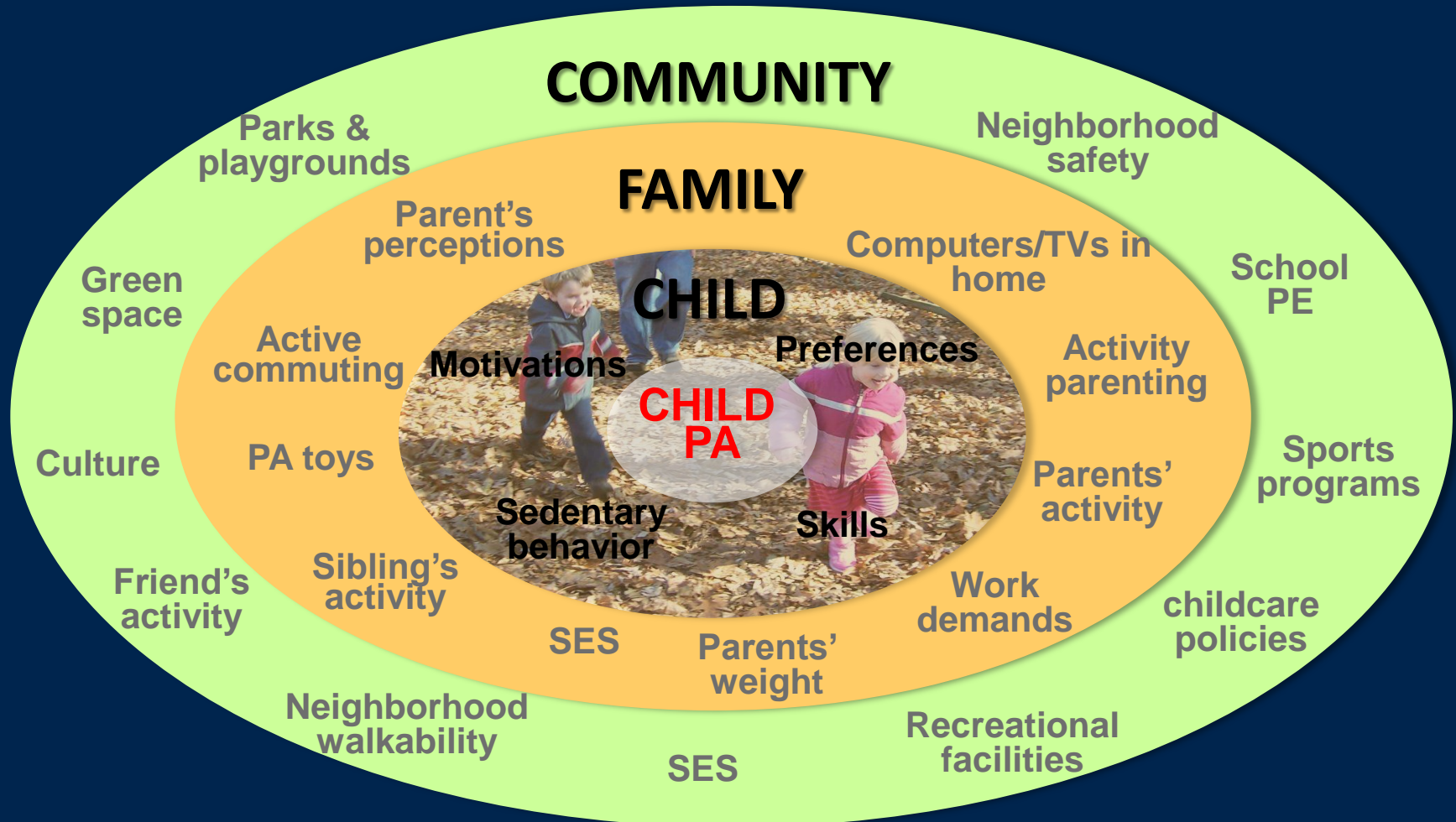
**Texas Children's
Hospital®**

BCM
Baylor College of Medicine

Teresia O'Connor, MD, MPH
Assistant Professor of Pediatrics
USDA/ARS Children's Nutrition Research Center
Academic General Pediatrics
Baylor College of Medicine

Pediatrics

Social Ecological model of child PA



Adapted from Sallis, Ann Rev Pub Health 2006; Davison, Birch, *Obes Rev*, 2001

Hispanic Population

- United States: 16.3% Hispanic (↑ 43% in 10 years)
- Texas: 37.8% Hispanic (↑ 42% in 10 years) (US census, 2010)
- Health Disparities:
 - Hispanic preschoolers higher rates of overweight/obesity (27% vs. 33%) (JAMA. 2012;)
 - Hispanic youth may be at higher risk for metabolic syndrome (Hepatology 2005; Prev Chron Dis 2005, MMVR. 2005)
 - Mexican American preschoolers less active than white (Sallis 1993)

Niños Activos Feasibility Study



- Test the feasibility of simultaneously objectively measuring the location and activity of preschool children in Houston, TX
 1. Assess ability to recruit and obtain location and activity data on preschool children.
 2. Assess the correlation of GPS data logger and parent-reported location diaries to identify the location of preschoolers in Houston, TX.
 3. Explore identification of travel mode with GPS data
 4. Explore utilizing location and trip data to assess where Hispanic preschool children are more active.

Niños Activos Feasibility Study

- Hispanic preschool children (n=15)
- Children wore monitors for 24-36 hours
 - QStarz BT1000X GPS data loggers
 - Actigraph GT3X accelerometer
- Parent completed location diary for 12 hr
- Data processing-
 - PALMS: Physical Activity and Location Measurement System at UC San Diego
 - <https://ucsd-palms-project.wikispaces.com/>



Outcomes of Interest

1. Child wear time and % valid data for GPS and accelerometers for 12 hr period
2. Correspondence of GPS location to location recorded by parent in location log (Kappa statistic)
3. Correspondence of travel mode via GPS and diary (Spearman correlations)
4. Association of location and child activity (multi-level models)

Niños Activos Feasibility Study

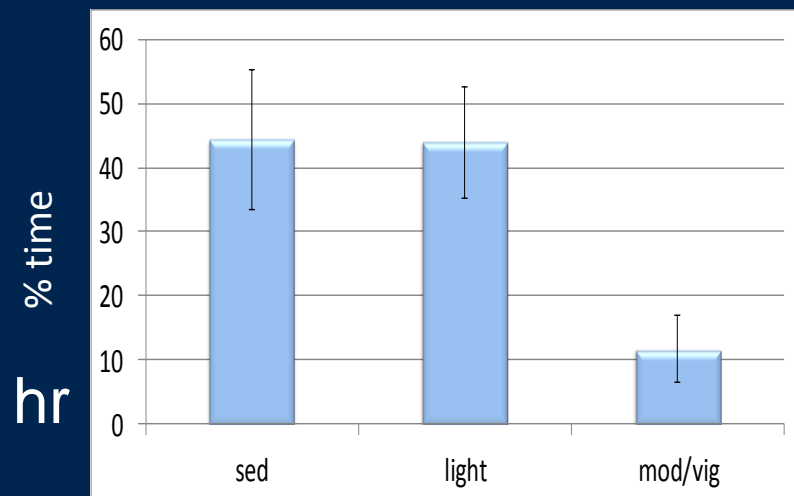


- Hispanic preschool children (n=15)

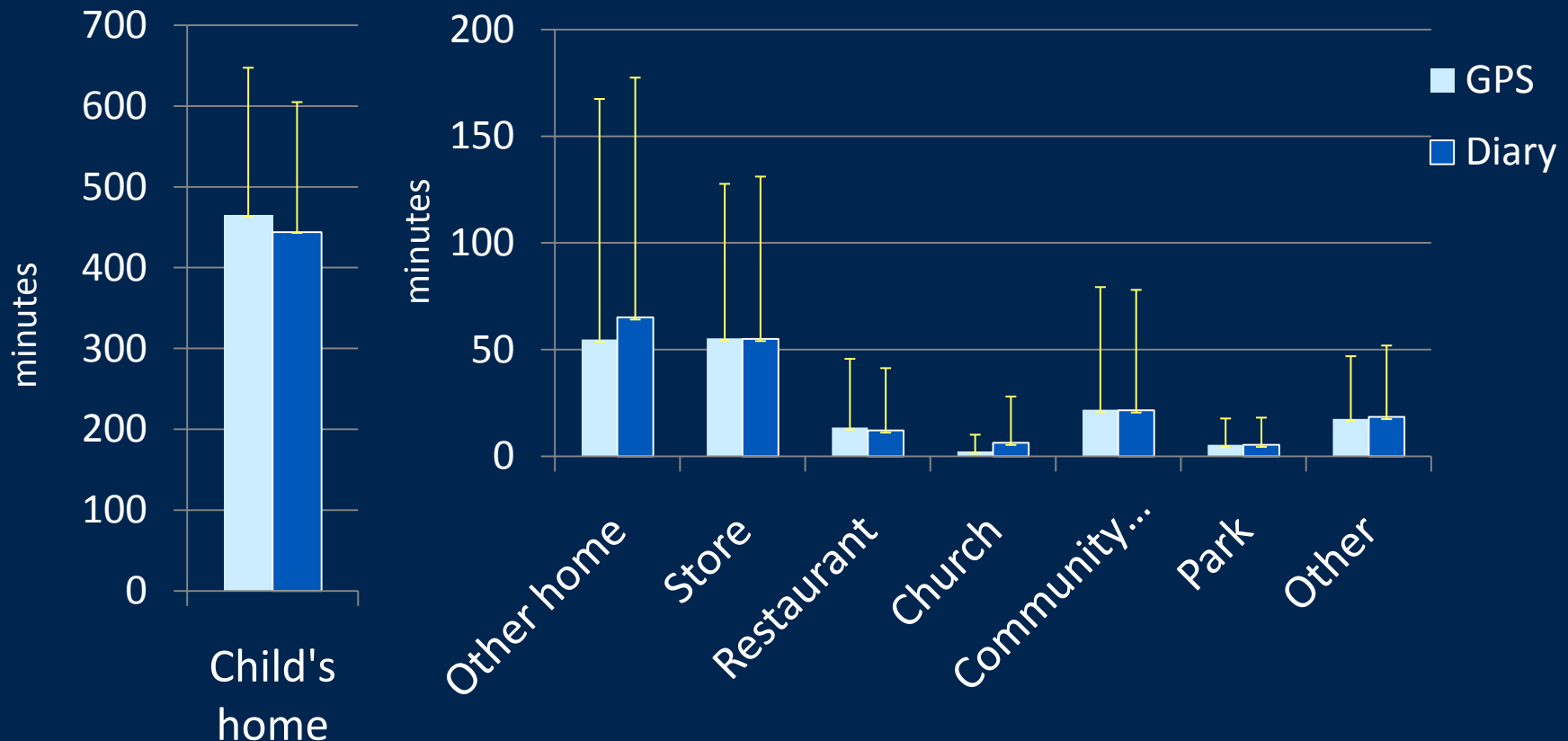
- 67% girls, age 4.7 years (0.8), 53% family income <\$50K/yr
- Type of residence
 - 53% single family homes
 - 34% apartments
 - 13% trailer homes

- (1) GPS and accelerometers for 12 hr

- GPS: 94.7% (sd 20.1) time with data
- CSA: 12/15 with valid data + 1 re-wear
 - Mean 10.0 hours (sd 2.7)



(2) Correspondence of location from GPS (PALM's) & diary



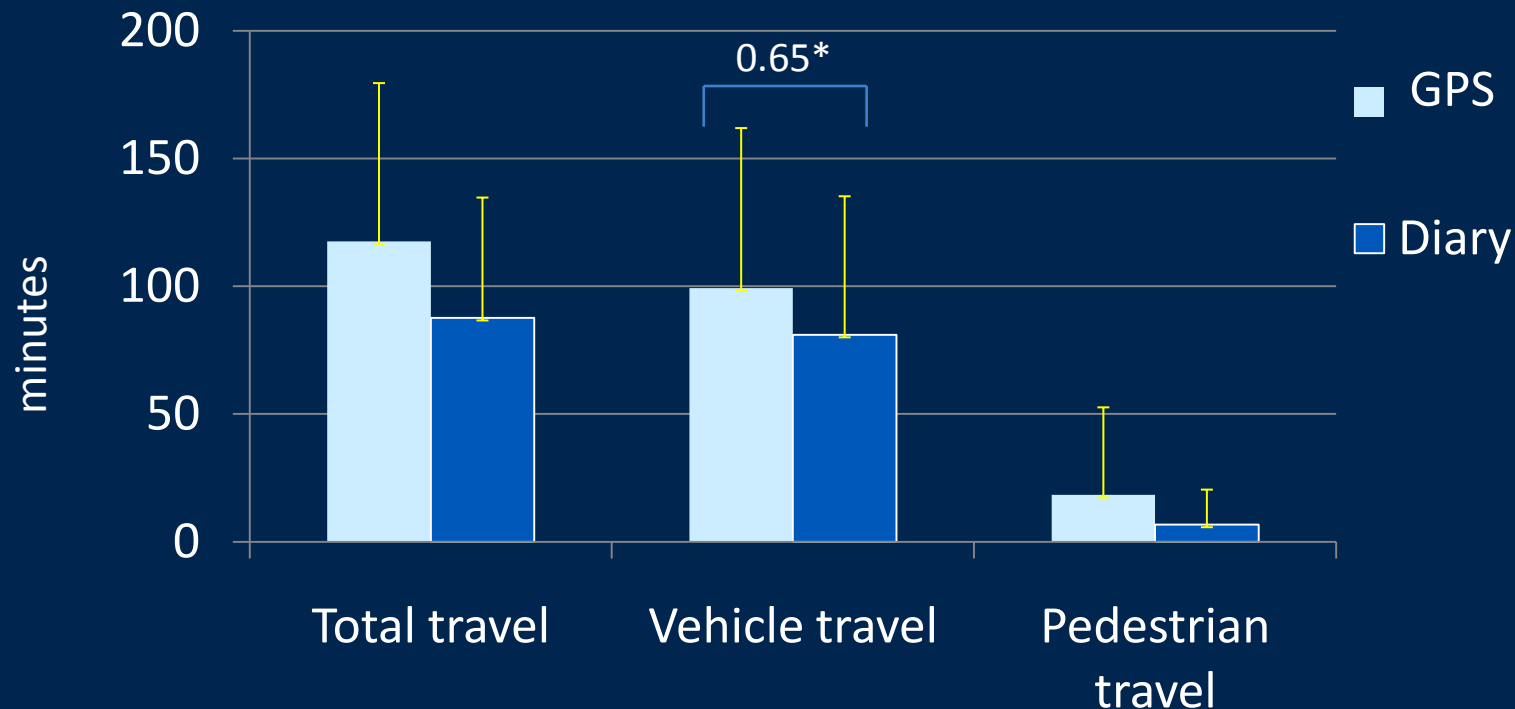
*No significant differences in minutes at each location by reporting method

(2) Correlation of time at location by GPS (PALM's) & diary

| Locations | % agreement (SD) | Kappa (SD) |
|------------------|------------------|-------------|
| Child's home | 92.0 (6.9) | 0.79 (0.18) |
| Other home | 91.9 (20.0) | 0.49 (0.50) |
| Store | 97.1 (4.3) | 0.78 (0.21) |
| Restaurant | 99.5 (1.2) | 0.84 (0.04) |
| Church* | 99.2 (2.3) | 0.45 |
| Community center | 99.9 (0.2) | 0.99 (0.1) |
| Park | 99.7 (1.0) | 0.78 (0.22) |
| Other location | 99.3 (1.3) | 0.78 (0.17) |

* Only 1 participant reported location

(3) Spearman correlations of time in travel mode via GPS (PALM's) & diary



Trip detection: ≥ 30 m/min (min of 100 m and duration ≥ 180 seconds)

Vehicle speed cut-off: 40 km/hour

Walking speed cut-off: 2 km/hour

* $p < 0.01$

** $p < 0.001$

(4) Association of Diary location and child activity (CPM)

| Predictors | exp(b) | 95% CI | p value |
|---|-------------|-------------------|-----------------|
| <i>Location (diary) ref: child's home</i> | | | |
| Other home | 1.36 | 0.51, 3.62 | .539 |
| Store | 1.15 | 0.71, 1.86 | .570 |
| Restaurant | 0.35 | 0.22, 0.56 | <.001 |
| Church | 0.91 | 0.61, 1.37 | .662 |
| Community center | 0.69 | 0.39, 1.22 | .198 |
| Park | 1.77 | 1.19, 2.64 | .005 |
| Other locations | 0.67 | 0.37, 1.21 | .185 |

(4) Association of GPS location and child activity (CPM)

| Predictors | exp(b) | 95% CI | p value |
|---|-------------|-------------------|-----------------|
| <i>Location (GPS) ref: child's home</i> | | | |
| Other home | 3.24 | 0.95, 11.03 | .060 |
| Store | 1.22 | 0.72, 2.08 | .458 |
| Restaurant | 0.50 | 0.24, 1.00 | .050 |
| Church | 1.74 | 1.22, 2.47 | .002 |
| Community center | 0.76 | 0.43, 1.33 | .331 |
| Park | 2.23 | 1.50, 3.31 | <.001 |
| Other locations | 0.72 | 0.35, 1.49 | .382 |

(4) Association of mode of travel to child activity (CPM)

| Predictors | exp(b) | 95% CI | p value |
|----------------------------------|-------------|-------------------|-----------------|
| <i>Trip (GPS) ref: no trip</i> | | | |
| Vehicle | 0.57 | 0.41, 0.84 | .003 |
| Walking | 0.85 | 0.38, 1.87 | .685 |
| <i>Trip (diary) ref: no trip</i> | | | |
| Vehicle | 0.48 | 0.35, 0.66 | <.001 |
| Walking | 1.18 | 0.7, 1.60 | .284 |

Conclusion Feasibility Study



1. Hispanic parents of 3-5 year old children willing
 - Children able to wear both monitors simultaneously
 - GPS data complete
2. Good correspondence for location
3. Moderate correspondence for mode of transportation using PALMS algorithms
4. Able to process simultaneous GPS and CSA data with associations of location and CPM identified

Limitation Feasibility Study



- Convenience sample
- Small sample
- Limited observed time
- Parent reported diary data at 5 minute intervals
- Limitations for detecting travel mode

Future Plans: Assess environmental and parental influences on Hispanic preschoolers PA

Acknowledgements



Co-Investigators

- E. Cerin (U of Hong Kong)
- R. Lee (U of Houston)
- S. Hughes (BCM/CNRC)
- T. Baranowski (BCM/CNRC)
- D. Thompson (BCM/CNRC)
- J. Mendoza (BCM/CNRC)
- N. Butte (BCM/CNRC)
- T. Nicklas (BCM/CNRC)

Staff

- J. Robles
- A. Hilmer
- V. Cordova
- D. Abdelsamad

Student Interns

- J. Ellis

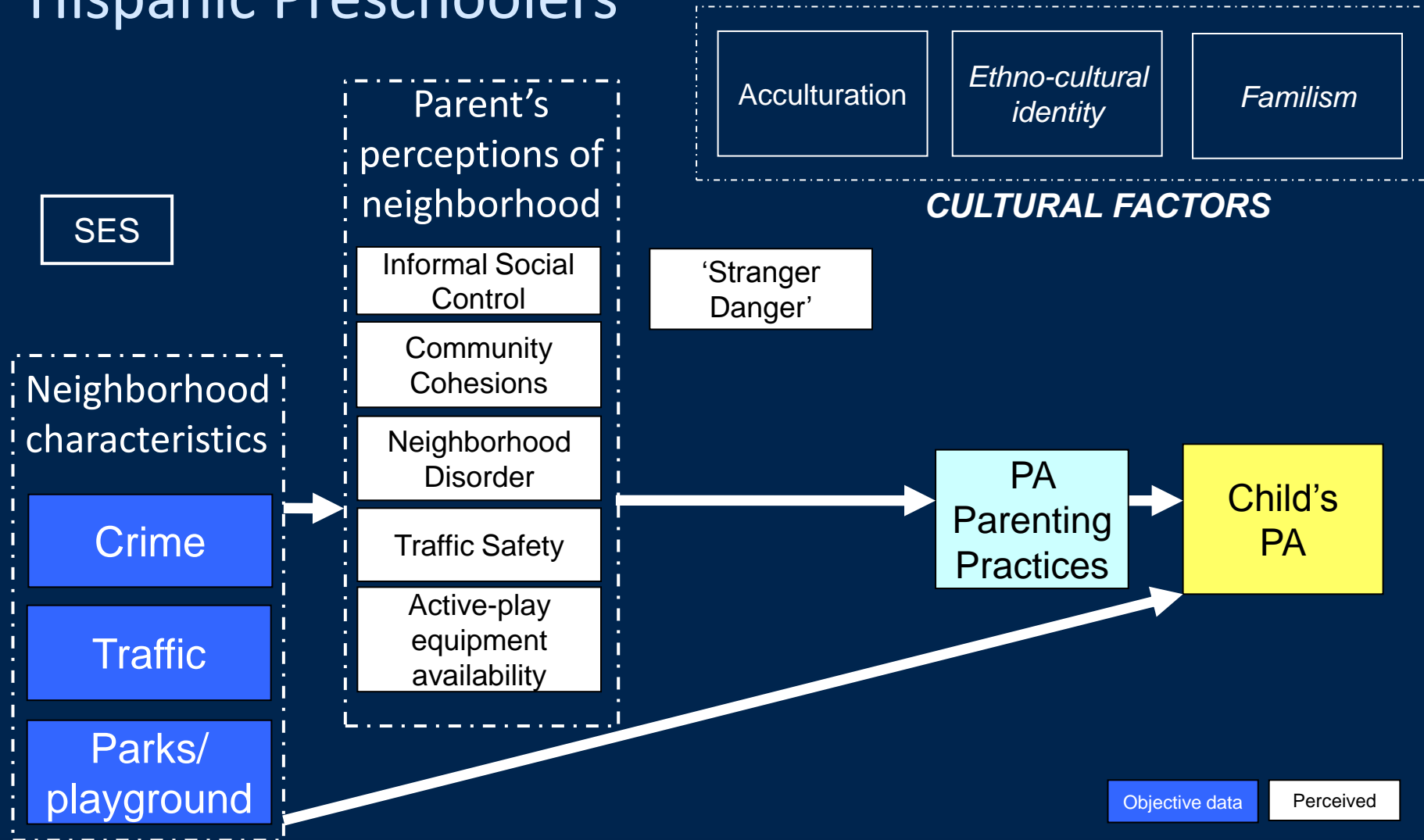
Collaboration: UC San Diego PALMS (K. Patrick and J Kerr)

Funding: NIH NICHD-1R21-HD060925



Questions?

Model of Environmental Influences on PA of Hispanic Preschoolers



Harris County CBG's High/Low Crime, High/Low Traffic

